

CITY OF TEMPE

PUBLIC WORKS DEPARTMENT

ENGINEERING DESIGN CRITERIA



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INTRODUCTION

The criteria in this document applies to all new and redevelopment building projects where the floor area is increased by at least 25% or site improvements that increase the valuation, excluding the land, by 50% or more. Also covered are site modifications that affect grading and drainage features, parking, and site amenities.

The City Engineer is authorized to interpret the criteria and grant variances where particular application would cause undue hardship to an applicant.

An applicant can appeal the decision of the City Engineer to the City Council upon filing a written Notice of Appeal with the City Engineer within fifteen (15) days of mailing of notice of interpretation or denial of variance to the address on file for applicant. Applicant shall pay an appeal fee of \$40.00 to the City of Tempe upon filing of the Notice of Appeal.

The City Council, upon receipt of a Notice of Appeal, shall set a hearing on the appeal and may grant, deny, or remand the decision with directions to the City Engineer.

In addition to this manual, the latest edition of the following document shall govern all utility and associated construction within the City right of way:

“City of Tempe Utility Permit Manual
Securing a Permit for Utility Construction
in the Public Right-of-Way”

This document adopts by reference the Maricopa Association of Governments “Uniform Standard Specifications and Details for Public Works Construction.” Latest edition and the “Tempe Standard Details Supplement to the MAG Uniform Standard Details”, latest edition and Chapter 29 of the Tempe City Code.

ENGINEERING SUBMITTAL & PLAN REVIEW

PROCEDURES & FREQUENT COMMENTS

1. Obtain a copy of the City of Tempe Engineering Design Criteria manual, latest edition, for requirements for engineering plan submittals. Some comments frequently occurring on plan review will be given below to help avoid common errors.
2. Submit 2 sets of civil plans to the Development Services Center Counter located in the east wing garden level at City Hall and notify the Development Services Specialist the submittal is for Engineering plan review. The first review by the Engineering Plan Reviewer will normally take a maximum of 15 working days to complete. The subsequent reviews will take 10 and then 5 working days to complete. Payment of the Engineering plan review fee is required at or before the time of picking up initial review redlines. Additional plan review fees will be charged after two submittals of Engineering plans and after submittals of revisions.
3. All notes on engineering plans shall be as given in the latest edition of the Engineering Design Criteria manual.
4. Engineering plans are to be submitted on 24" x 36" sheets. Submit water, sewer, onsite grading and drainage, underground fire lines, street/paving plans (including storm drains), and street lighting when plans are not included with paving plans.
5. The maximum scale for engineering plans is 1" = 30' and plans shall be legible at 50% reduction.
6. All overhead utility lines, other than transmission lines on or adjacent to the site must be placed underground. Existing services will be required to be placed underground where the cumulative expansion is greater than 25% of the existing building floor area, or the cumulative alteration at a cost exceeding fifty percent (50%) of the current appraised value of the structure.
7. Normally, developers are required to retain the 100 year storm on site. Refer to special overlay districts (Southwest and Rio Salado) for special retention requirements.
8. All stormwater is required to be stored on-site for a maximum of 36 hours. Underground storage is not allowed without the specific written approval of the City Engineer.
9. All developments over 1 acre shall meet the National Pollution Discharge Elimination System (NPDES) requirements. Submit copy of the Notice of Intent (NOI) with a copy of the certified mail receipt.

10. As soon as all comments have been successfully addressed, the engineer will be notified that permits are ready to issue. Engineering inspectors will then provide the inspections required for final acceptance of the engineering work as the construction proceeds.
11. For any new easements or dedications provide current title report or warranty deed (dated within the last 3 months), easement legal descriptions & exhibits with the first submittal of the engineering plans.
12. Sidewalks are required in all zoning categories, including all non-residential classifications. Sidewalks shall meet the provisions of the Americans with Disabilities Act.
13. Pavement cutting for utility installation is prohibited without the approval of the City Engineer.
14. New sewer services shall be constructed according to Maricopa Association of Government (MAG) standard details 440-1 and 440-4. Construction of all other underground utilities that can not be located using surface features (valve boxes, meter boxes, manholes, cleanouts, catch basins, etc.) shall include some type of metallic pull wire, locator strip or other type of locating device in accordance with ARS 40-360.22.

CITY OF TEMPE ANNOUNCES NEW ENGINEERING FEE SCHEDULE

The Tempe City Council at their October 20, 2005, meeting approved a new fee schedule with an annual CPI adjustment for Engineering plan review, permits, purchase of engineering records. The new fee schedule, which was effective on January 1, 2006, is as follows:

PRIVATE DEVELOPMENT PLAN REVIEW FEES (Excluding Public Utility Plan Reviews)

The fee for Engineering plan review is \$385 per sheet per discipline. The fee must be paid prior to staff returning the initial engineering submittal red lines. These fees cover a maximum of 2 plan reviews. Any plan reviews required after 2 submittals and revisions will be charged at a rate of \$290 per sheet per discipline payable prior to staff returning the initial plan review red lines to the applicant. Should revision submittals exceed three, all subsequent revision submittals will be charged at a rate of \$290 per sheet per discipline. Drainage report review will be charged at a rate of \$500 per report. Expedited plan review will be charged at a rate of \$770 per sheet, per discipline.

ABANDONMENTS, ENCROACHMENTS, AND PUBLIC UTILITY PERMITS

Abandonments

Public right-of-way abandonment processing fee	\$750 each
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Encroachments

Encroachment Permits (non-commercial)	\$150 each
Encroachment Permits (commercial)	\$600 each per year
(above 2 items include environmental monitoring well leases)	

Public Utility Fees

The following fees will be charged for utility plan review, inspection and cutting of pavement unless specifically exempted by a current license. Charges will be billed on a monthly basis unless the city approves an alternate arrangement.

Permit for plan review and inspection of services drops	\$40 per service drop
Plan review fee	\$235 per sheet
Review of cabinets greater than 30" high	\$150 per cabinet per location
Inspection fee (no pavement cut)	\$110 per permit + \$0.55 per LF if length exceeds 300 LF
Inspection fee (pavement cuts/concrete work)	\$250 per permit + \$1.55 per LF if length exceeds 300 LF

Annual Blanket Permit	\$1020 each
Minimum utility inspection/testing	\$100 each
Surcharge for cutting new or resurfaced pavement less than 3 years old.	
Openings less than 9 square feet or 9 linear feet of trench	\$1,000
Trenches over 9 linear feet long	\$2,500 for every 50 LF of trench or fraction thereof.
Surcharge for cutting new or resurfaced pavement more than 3 years old but less than 7 years old.	
Openings less than 9 square feet or 9 linear feet of trench	\$500
Trenches over 9 feet long	\$1,250 for every 50 linear feet of trench or fraction thereof.
Utility manholes	\$58 each
Manhole adjustment	\$32 each
Boring pits	\$55 each
Potholes	\$30 each
Wireless Antenna	\$80 per location

Fees for Tapping Water Mains

<i>Meter Size</i>	<i>Fee</i>
5/8"	\$570
3/4"	570
1"	626
1-1/2"	1,030
2"	1,359

Fees for Tapping Sanitary Sewer Lines

6" alley (including pavement replacement)	\$1,100
6" local & collector street (including pavement replacement)	\$1,800
6" arterial street	Actual cost
4" machine tap only	\$110
6" machine tap only	\$110

PRIVATE DEVELOPMENT INSPECTION FEES

Water

Water mains	\$1.85 per linear foot
Water services	\$25.00 each
Fire hydrants	\$64.00 each
Fire sprinkler connections	\$0.75 per linear foot
Tap, sleeve & valve	\$110.00 each
Pipe encasement (in 20 linear feet sections)	\$20.00 each
Boring pit	\$55.00 each
Valve Cluster	\$220.00 each

Sewer

Sewer lines	\$1.50 per linear foot
Sewer services	\$25.00 each
Manholes, drop connects & cleanouts	\$58.00 each

Street Improvements

Curb & gutter	\$0.40 per linear foot
Sidewalk & bike paths	\$0.45 per linear foot
Sidewalk ramp	\$46.00 each
Valley gutters & aprons	\$30.00 each
Driveway & alley entrances	\$88.00 each
Alley grading	\$0.30 per square yard
New or replacement paving	\$0.60 per square yard
Overlay	\$0.15 per square yard
Mill and overlay	\$0.20 per square yard
Manhole adjustments	\$32.00 each
Valve box adjustments	\$32.00 each
Irrigation lines & ditches	\$2.45 per linear foot
Storm drains	\$2.45 per linear foot
Storm water retention pipes	\$1.00 per linear foot
Drywell	\$86.00 each
Headwalls	\$48.00 each
Catch basins & scuppers	\$78.00 each
Manholes	\$58.00 each

Drainage

See Tempe City Code Sect. 12-73

Lighting

Street light inspection	\$66.00 each
Street light energization (SRP area only)	\$223.00 each

Refuse enclosure

\$15.00 each

Additional and Miscellaneous Fees

Pavement cut/concrete work	\$250.00 plus \$1.55 per linear foot if length exceed 300 linear feet.
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Trench (no pavement cut)	\$110.00 plus \$0.55 per linear foot if length exceeds 300 linear feet.
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Pothole	\$30.00 each
Boring pit	\$55.00 each
Survey monuments	\$8.50 each
Street name sign	\$115.00 each
Miscellaneous permits not covered above	\$150.00 each
Minimum testing and inspections	\$150.00 each
Permit renewal prior to expiration (up to 180 days)	25% of permit fee
Second and additional permit renewal	100% of permit fee
Expired permit renewal (over 180 days)	100% of permit fee
After hours inspection/testing	\$193.50 per hour
Records	10% of total permits fee

Investigation fee (work without a permit)	Greater of \$250.00 or double the permit fee not to exceed \$2,500.00
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Water Re-test

Bacteria and chlorine	\$135 per sample point
Inspection (charge-out rate)	\$80.00 per hour (1 hour minimum)
Refill 6" water line	0.00160 per linear foot (\$5.00 minimum)
Refill 8" water line	0.00279 per linear foot (\$5.00 minimum)
Refill 12" water line	0.00642 per linear foot (\$5.00 minimum)
Pressure testing/retesting	\$322.50 each

Sanitary Sewers & Storm Drains

Re-TV pipe	\$90 per hour (1 hour minimum)
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SALE OF ENGINEERING AND GIS RECORDS

The following schedule is established to set a standard cost for the sale of City Engineering and GIS mapping records.

1. Plots – sizes 8 ½" x 11" (letter) and 11" x 17" (tabloid)
 - a. Two (2) or less plots (non-commercial use) no charge
 - b. Three (3) or more plots (non-commercial use) \$1.00 each
 - c. Any number of plots (commercial use) \$1.00 each
2. Plots – larger than 11" x 17" up to 36" wide
 - a. City map of landbase, survey, water, sewer, etc. \$5.00 each
 - b. Quarter section map of landbase, aerial or utilities \$10.00 each
 - c. As-built plan sheet \$1.00 each
 - d. Each custom plot \$10.00 plus \$5.00 per linear foot or fraction of paper over three feet.
3. Blueline Prints
 - a. 24" x 36" or 36" x 36" \$5.00 each
4. Digital Data
 - a. Quarter section in MicroStation DGN format
 - (i) Landbase \$300.00 each
 - (ii) Single utility (sewer, water, drainage or improvements) \$100.00 each
 - (iii) Landbase and all utilities \$550.00 each
 - b. Quarter section aerial in Intergraph COT grayscale format \$30.00 each
 - c. As-built plan sheet image in black & white TIFF format \$1.00 each
 - d. Custom output in MicroStation DGN format
 - (i) Setup for location \$100.00 per area per occurrence plus \$5.00 per vertex over (8) fence vertices.
 - (ii) Landbase \$1.50 per 10,000 square feet or fraction
 - (iii) Single utility \$0.50 per 10,000 square feet or fraction
 - (iv) Landbase & all utilities \$2.75 per 10,000 square feet or fraction
 - (v) Minimum purchase of custom output \$200.00 each

- e. Format translation of city provided data files – prices in addition to source data files
 - (i) Setup for translation \$50.00 per occurrence
 - (ii) MicroStation DGN file to AutoCAD DWG or DXF file \$20.00/DWG or DXF file
 - (iii) Intergraph COT file to TIFF Or JPEG file \$20.00/TIFF or JPEG file
 - (iv) Minimum purchase of Translation services \$100.00, performed using default settings of translation software.
- f. CD media for data \$10.00 each, if occurring purchase is under \$100.00

5. Conditions and restrictions

- a. All commercial orders and digital data orders will be required to document purpose of use.
- b. Plotting orders in excess of \$25.00 and all blueline and digital data orders will require full pre-payment before order is processed.
- c. Digital data will be provided on city issued media only.
- d. All orders and payments must be done in person only.
- e. Blueline orders will only be accepted for Engineering documents on mylar that do not have a digital image on file.

INTERPRETATIONS / VARIANCES / APPEALS

The City Engineer is authorized to interpret the criteria and grant variances where particular application would cause undue hardship to an applicant.

An applicant can appeal the decision of the City Engineer to the City Council upon filing a written notice of appeal with the City Engineer within fifteen days of mailing of notice of interpretation or denial of variance to the address on file for applicant. Applicant shall pay an appeal fee of \$40.00 to the City of Tempe upon filing of the Notice of Appeal.

The City Council upon receipt of a Notice to Appeal shall set a hearing on the appeal and may grant, deny, or remand the decision with directions to the City Engineer.

DEFINITIONS

1. Sheet

A 24" x 36" drawing showing site plans, various discipline plans and details.
Maximum plan view scale is 1"=30'.

2. Discipline:

Type of work shown on Engineering plans such as:

- Water *
- Sewer *
- Onsite grading and drainage
- Underground firelines
- Street/paving plans (including storm drains) *
- Street lighting when plans are not included with paving plans*

(*) in City right of way or easement

SITE PLAN CRITERIA

A. GENERAL

1. Allow approximately 15 working days for review of the first submittal, ten (10) days for review of first resubmittal, and five (5) days for all subsequent resubmittals.
2. Each submittal shall have two complete sets of prints of engineering plans. Each resubmittal shall have two complete sets of corrected prints of engineering plans plus the City's redlines of the previous submittal.

B. MINIMUM REQUIREMENTS

1. Include a complete legal description as it appears on the property's deed.
2. Include a vicinity map showing the property in relation to that of the major streets.
3. Include north arrow (pointing to right or top edge of sheet).
4. Include owner's name or names as it appears on the deed (property, business, developer, etc.) and mailing addresses.
5. Include name, address and phone number of person to whom plans should be returned.
6. Include legal address of property.
7. Show location of and distance to closest fire hydrant.
 - a. Fire hydrants shall be provided to within 150' of any point on the first floor of any building.
 - b. A fire hydrant shall be provided within 150' of any fire department connection.
8. Show location and size of all water meters (existing and/or new) including dimension from property line and gpm needed.
9. Show location and size of all sewer taps (existing and/or new) including dimension from property line.
10. Sidewalks are required adjacent to both sides of all city streets. Arterial streets require 8' wide sidewalks, L-1 streets require 5'-6" wide sidewalks, and all other streets require 6'-0" wide sidewalks.
11. Include a benchmark (use and note City of Tempe datum).

12. Tie property to at least two record survey control corners, preferably section and/or quarter corners.
13. Show all lot dimensions, widths of easements, and rights of way, including bearings and distances.
14. Show and dimension the parking lot layout, drainage pattern, proposed spot elevations and existing topography of site and adjacent areas.
15. Show the finished floor elevation (minimum of 8" commercial and 14" residential above lot outfall).
16. Show and dimension all topo in City right of way including pavement, curb, gutter, sidewalk, power poles, medians, traffic signal equipment, street lights, etc.
17. Existing overhead utility lines (other than transmission lines) shall be placed underground per City Code Sections 25-120 through 25-126 and Ordinance No. 88.85.
18. Show and dimension all existing utilities (water, gas, power, irrigation, sewer, storm drain, etc.) and tie to property line and/or street centerline.
19. Distinguish between all existing and proposed construction and clearly show any planned phasing.
20. Show and dimension all existing and proposed curb cuts for driveways per Tempe Standard Detail T-320. Driveway entrances are required on roll curb streets except for single family residential. Driveway curb cuts shall not be located within 100' of the point of intersection of property lines at arterial/arterial or arterial/collector street intersections.
21. Show, dimension and locate all existing streets, sidewalks, driveways, medians and median openings within 125' of the project boundaries on both sides of the street.
22. Provide 45' minimum turn radius for all drives.
23. Show widths of drives for refuse and fire circulation (20' wide minimum). When parking exists on both sides of the drive, it shall be a minimum of 23' wide.
24. Show and dimension proposed and existing perimeter walls, wall heights, spot grades on both sides of walls, and adjacent building faces near property line.

25. Signature block as follows (lower right-hand corner of first sheet):

APPROVAL FOR OFFSITES AND DRAINAGE ONLY

CITY ENGINEER

DATE

26. Use 1" = 30' maximum engineering scale and show a bar scale.
27. All plans must be on 24" x 36" sheets and be legible at 50% reduction.
28. Show net area of site in square feet and acres.
29. Surface retention on-site of the 100 year, 1 hour storm per City of Tempe Drainage Criteria is required. Underground retention is not permitted without the specific written approval of the City Engineer.
30. Show calculations for retention volume required and provided, high water levels and bottom elevations for retention areas, rim elevations for drywells and catch basins, invert elevations for drainage pipes and 4:1 maximum side slopes for landscaped retention areas. Maximum depth of 3' in landscaped areas and 1' maximum depth in paved areas (see Figure III in the Drainage Criteria Section also).
31. Show positive grade breaks at all property and right-of-way lines.
32. Include applicable City of Tempe notes (General, Site, Paving, Sewer and Water, On-site Drainage, Street Lighting).
33. Include completed utility company submittals.
34. Include the Permit and "As-Built" Information block.
35. Show existing and proposed landscaping in water, sewer and storm drain easements. No deep-rooted shrubs or trees are allowed.
36. Include the Arizona Registered Civil Engineer's seal, date, and signature.
37. Call out all applicable standard specifications and standard details on the plan.
38. Gates are normally not permitted on refuse enclosures. Where approved, gates crossing an onsite drive shall be left open from 6:00 a.m. to 4:30 p.m. on refuse pickup days. Provide gate details on the engineering plans. Hardware must be externally mounted so as not to impact enclosure internal dimensions.

39. A boundary survey and/or a title report less than three months old may be required.
40. Show all underground electric circuits, conduit, traffic signal poles, pole foundations, pull boxes and other traffic furniture approved by the Transportation Division. Show locations of any required street lights to be installed with project.
41. Show the Engineering Private Development (EN) Number and Development Services (DS) Number (assigned during the first review) in the right hand bottom margin on each sheet. Use 36 pt. Helvetica Kroy or 350 CL Leroy Lettering.
42. Provide title block on each sheet showing project name, type of drawing (water, sewer, grading and drainage, etc.) sheet number and quarter section.
43. Plans are accepted for six (6) months following approval date. One 6 month extension is allowed if an extension is requested prior to the completion of the six (6) month period at an additional cost of 25% of the total permit fee. The approval expires if permits have not been picked up and paid for or extended within the six (6) month period. An additional 100% of the permit fees will be charged for all renewals after the expiration date.
44. Provide an estimate of quantities of construction items, including earthwork cut and fill (see following sheet for list).

ESTIMATED QUANTITIES

The following is a list of quantities currently used by the City. Select all applicable items and show on the first sheet of the plans showing actual quantities for your project (complete the following table, selecting only the items applicable to your project).

<u>Item</u>	<u>Unit</u>	<u>Quantity</u>
Water Main	LF	
Water Services	EA	
Water Use Fee	EA	
Driveway or Alley Entrance	EA	
Concrete Curb and Gutter	LF	
Sidewalk or Bike Path	LF	
Valley Gutter and Apron	EA	
Paving	SY	
Alley Surfacing	SY	
Irrigation	LF	
Storm Drains	LF	
Headwalls	EA	
Catch Basin	EA	
Manholes	EA	
Sewer Lines-Testing-Inspection	LF	
Sewer Services-Testing-Inspection	EA	
Manhole/Cleanout-Testing-Insp.	EA	
6" Drill/Tap	EA	
Refuse Enclosure	EA	
Energization (overhead)	EA	
Energization (underground)	EA	
Trench Inspection	LF	
Street Light Pole Inspection	EA	

GENERAL PLAT REQUIREMENTS

A. GENERAL

1. Show the proposed subdivision name on the plat.
2. Locate the plat by section, township, range, and county.
3. The plan shall have mathematical ties to a minimum of two record survey control corners preferably section corners and/or quarter corners as shown on the City of Tempe horizontal control map.
4. Show and note City of Tempe elevation benchmark used for vertical datum if needed (example: Condo Plats).
5. Include the names, addresses and phone numbers of the subdivider and the Engineer who prepared the plat.
6. Show the scale, north arrow, date of preparation and any revision dates.
7. Show the subdivision on a location map of the area.
8. The plat is required to be signed by an Arizona Registered Land Surveyor.
9. Maximum scale shall be 1" = 50' except for Tract Maps which shall be 1"= 100' maximum; show a bar scale on each plan sheet.
10. All plans must be submitted on 24" x 36" sheets only and be legible at 50% reduction.
11. Include a key map if two or more sheets are required for the drafting of the final plat.
12. On each sheet show the Engineering Private Development (EN) Number and the Development Services (DS) number (assigned during the first review) in the lower right hand corner in the bottom margin. Use 36 pt. Helvetica Kroy or 350 CL Leroy Lettering.
13. Provide title block on each sheet showing project name, type of drawing (preliminary plat, final plat, etc.), sheet number, and quarter section.

B. EXISTING CONDITIONS

1. Identify and dimension all existing rights of way and easements.
2. Show existing structures, site amenities, and municipal corporation lines.
3. Show the name, book, and page number of adjacent recorded tracts.

C. PROPOSED DEVELOPMENT

1. Show the proposed street and alley layout and centerline dimensions of streets.
2. Show proposed street names. They shall conform to the City of Tempe grid.
3. Show street connections to adjoining platted tracts.
4. All cul-de-sac streets shall terminate in a circular right-of-way with a minimum radius of 55' and shall have an improved traffic turning circle with a minimum radius of 45'. The maximum length of any cul-de-sac street shall be 400' measured from the intersecting right-of-way lines to the face of curb at the back of the cul-de-sac.
5. If the tangent centerlines deflect more than 10° and less than 90°, they shall be connected by a 600' minimum radius curve for collector streets or a 200' minimum radius curve for local streets.
6. There shall be a tangent of at least 100' between reverse curves for collector and local streets.
7. All streets intersecting an arterial route shall do so at a 90° angle.
8. All local streets shall intersect at an angle between 75° and 105°.
9. Right-of-way widths shall match the City's standard street and alley cross sections.
10. Paved alleys shall be 20' wide.
11. A.B.C. surfaced alleys shall be 16' wide (minimum).
12. Partial alleys shall be 12' wide.
13. Alleys shall have corners cut off a minimum of 15' on each side of the corner at all changes of alignment.

14. Dead-end alleys are prohibited.
15. Local streets that intersect collector or arterial streets shall have a tangent centerline length of at least 150'.
16. If a local street curve intersects a collector or arterial street, it shall have a centerline radius greater than 400'.
17. All street corners shall have minimum right of way triangular cutoffs as follows:
 - a. 15' x 15' cutoff where local streets intersect
 - b. 15' x 15' cutoff where local street intersects collector street
 - c. 20' x 20' cutoff where collector streets intersect.
 - d. 20' x 20' cutoff where local and collector streets intersect arterial streets.
 - e. 30' x 30' cutoff where arterial streets intersect
18. For non-residential lots less than 100' in width, common access easements shall be provided for Refuse and Fire Department circulation.
19. Show dimensions and bearings for all lots.
20. Where two streets intersect a common local or collector street and those streets are offset from each other, the minimum offset shall be 125'. Where the common street is an arterial street the minimum offset shall be 330'.
21. Show the location, width dimensions, and use of all existing or proposed easements.

ADDITIONAL PRELIMINARY PLAT REQUIREMENTS

A. EXISTING CONDITIONS

1. Show and dimension the existing drainage by the use of contour lines
2. Show and note City of Tempe elevation benchmark used for vertical datum.
3. Show and dimension existing irrigation features and the direction of flow. Indicate any modifications.
4. Show existing water, sewer, storm drain, irrigation pipelines, pipeline size, material, and associated facilities.
5. Show the existing zoning and that of adjacent tracts.
6. Fully dimension the boundary and show any encroachments.
7. Show the gross and net acreage of the tract.
8. Include legal description.

B. PROPOSED DEVELOPMENT

1. If there will be vehicular access to lots from the alley, the alley shall be 20' wide and paved to the nearest street or to both end streets depending on use.
2. Show street and drive widths.
3. Lengths of blocks measured along the centerline shall be no longer than 1200' except in the case of 1/2-acre lots where the maximum block length is 1700'.
4. Clearly show all land dedicated for public use.
5. If the zoning of this area is to be changed, indicate the proposed change.

C. PROPOSED UTILITIES

1. Show proposed sewer lines, line sizes, pipe type, manholes and cleanouts, and the distances to the street centerline and/or property lines.
2. Show proposed waterlines, line sizes, pipe type, valves, fire hydrants, and the distance to the street centerline and/or property line.

D. PROPOSED HYDROLOGY

1. Show proposed retention areas for 100 year 1 hour storm.
2. Show limits of flood zone and the elevation of the base flood.
3. Submit preliminary hydrology calculations using City design criteria.
4. Show storm drains, locations of inlets, and the distance from the street centerline and/or property line.

ADDITIONAL FINAL PLAT REQUIREMENTS

A. GENERAL

1. Fully dimension the map and submit a copy of the coordinate point map and coordinate list from the land surveyor with all project coordinates. The disk listing the coordinates should be standard 3-1/2" high-density floppy disk in ASCII format.
2. Fully dimension each parcel, lot, and tract and show its area on the plat.
3. Fully dimension and clearly identify all excepted parcels and label them or "exception" them "not part of this plat".
4. The plat shall have mathematical ties to a minimum of two record survey control corners preferably section corners and/or quarter corners as shown on the City of Tempe horizontal control map.
5. Locate and identify existing monuments.
6. Identify survey monuments to be set.
7. For all curvilinear streets, show points of tangency's, centerline radius, tangent distance, central angle, and length.
8. Show drainage easements for areas where retention is required for street run-off.
9. Show flood hazard boundary from FEMA Maps and cite restrictions in declaration.
10. Comply with all of the conditions of approval as evidenced by the minutes of the following meetings.
 - a. City Council
 - b. Board of Adjustment
 - c. Design Review Board
 - d. Planning Commission
11. Engineering plans shall be approved by the City Engineer prior to recordation of the final plat.
12. Where on-site storm water retention occurs, a typical lot grading plan shall be included on the plat.

13. Provide current title report (less than three months old) of land being platted.

B. DEDICATION AND ACKNOWLEDGMENT

1. Include all necessary dedications on the plat.
2. Include the location by section, township, range, and county in the dedication.
3. The execution of the dedication shall be acknowledged.
4. The acknowledgment shall be certified by a notary public.

C. STREET DESIGN

1. Where the subdivision abuts an arterial street, use reverse frontage lots with a 1' wide vehicular non-access easement along the arterial street.
2. Collector streets may be extended to the subdivision boundary for future connection with adjacent unsubdivided land, but not necessarily as a straight line street (e.g. can be curved or offset appropriately).
3. Where the subdivision abuts or contains a railroad right-of-way, limited access highway, irrigation canal, or abuts Industrial zoned land streets parallel and on each side of such right-of-way for a suitable distance may be required.
4. Half streets shall be used where necessary to comply with the approved street pattern. Where such half street furnishes the only access to the subdivision, the remaining half shall be constructed or a portion thereof to make the necessary transition as determined by the Traffic Engineering Division.

D. CERTIFICATIONS

1. Certification by an Arizona Registered Land Surveyor.
2. Certificate of plat approval by the Planning Department.
3. Certificate of plat approval by the City Engineer.
4. Certificate of plat approval by the City Council.
5. Certificate of assured water supply.

E. CHANGES TO A RECORDED PLAT:

1. Any material change to a recorded subdivision plat requires that the plat be amended. Material change includes, but is not limited to:

- Any change in location or dimensions of a property line, tract, dedicated easement, or right of way.
 - Any change in acreage due to 1) above.
 - Any change in the legal description which alters the dimensions of the plat or its area.
 - Any change, except for obvious spelling errors, in the dedicatory statement.
 - Other matters as determined by the City Engineer or representatives thereof.
2. Minor typographical errors in dimensioning or annotation shall be corrected by a Certificate of Correction.

Procedure:

The Certificate of Correction shall include the following:

- The corrections and/or changes requested.
 - The date that the plat was recorded.
 - The Maricopa County recorder's instrument number of the plat which is to be modified.
 - A signature line for approval by the City Engineer or representatives thereof.
 - An imprint of the seal and signature of a Registered Land Surveyor in Arizona.
3. The developer or his representative shall have the certificate recorded in the Office of the Maricopa County Recorder. A copy of the recorded certificate shall be filed in the Office of the City Clerk and a copy shall be returned to the City Engineer.

PAVING & STREET DESIGN CRITERIA

A. GENERAL

1. Include all applicable standard specifications and standard details on the plan.
2. Include the current general notes on the plan.
3. Include the permit and as-built information note and as-built certification note.
4. Show the completed utility approval block on the plan.
5. Include a site location map.
6. Benchmark shall be on City of Tempe datum. Horizontal control will be the same as the subdivision plat datum.
7. Show a north arrow and bar scale on each sheet of plans pointing up or to the right.
8. Include an index map showing sheet numbers on the title sheet.
9. Show and locate all existing and proposed utilities, storm drains, and irrigation lines on the plans.
10. If any streets are located within the jurisdiction of the State or County, a permit from that jurisdiction is required.
11. Maximum scale shall be 1" = 30', show a bar scale on each plan sheet.
12. Plans shall be sealed, dated, and signed by an Arizona Registered Professional Engineer.
13. Plans shall be on 24" x 36" mylar and be legible at 50% reduction.
14. Include approval block in the lower right hand corner for the City Engineer.
15. Provide an estimate of quantities of construction items.
16. On each sheet show the Engineering Private Development (EN) Number and Development Services (DS) number (assigned during the first review) in the lower right hand corner in the bottom margin. Use 36 pt. Helvetica Kroy or 350 CL Leroy Lettering.

17. Provide title block on each sheet showing project name, type of drawing (paving), sheet number, and quarter section.
18. Envibro Drywells shall be installed at all gas stations.

B. LAYOUT OF STREETS & ALLEYS

1. Show street names, locations, widths and easements; they shall agree with the final plat.
2. The alley and street drainage shall agree with the accepted drainage plan.
3. All cross-sections and dimensions of streets and alleys shall meet City Standards.
4. Valley gutters are not permitted across collector or arterial streets.
5. All curb returns shall have a minimum radius of 20' except:
 - a. A 25' radius where a local or residential collector street turns 90°.
 - b. A 30' radius where two arterials intersect.
6. All dead-end streets serving more than four lots shall be provided with temporary connections or turn-arounds.
7. Location of driveways and dimensions shall be shown.
8. Dead end alleys are prohibited.
9. All new and existing survey monuments shall be shown on the plans and are required at all street intersections, P.C.'s, P.T.'s, P.I.'s, section corners, quarter corners, sixteenth corners, and subdivision corners if applicable. After all improvements have been installed, an Arizona Registered Land Surveyor shall check the location of monuments and certify their accuracy and compliance.
10. Street names shall conform to the existing City grid.
11. Local streets shall be designed to minimize through traffic use.
12. Maximum block length shall be 1200' except that in the case of 1/2-acre lots the maximum block length shall be 1700'.
13. Minimum 15' X 15' property line cutoffs are required at all angles and intersections of alleys.

14. 15' X 15' property line corner cutoffs are required at local street intersections and where local and collector streets intersect. 20' x 20' cutoffs are required at collector street intersections and where local and collector streets intersect arterial streets. 30' x 30' cutoffs are required at all arterial intersections.
15. Where two streets intersect, a common local or collector street and those streets are offset from each other, the minimum offset shall be 125'. Where the common street is an arterial street, the minimum offset shall be 330'.
16. All intersections with arterial streets shall be at 90°.
17. Local street intersections shall vary no more than 15° from a 90° angle.
18. Intersecting street center lines with an angle between them at more than 10° but less than 90° shall be connected by a minimum centerline radius of 600' for collector streets or 200' minimum radius for local streets.
19. Where a local street intersects a collector or arterial street, provide minimum tangent approach distance of 150' (measured from the right-of-way line of the major street) or a minimum radius of 400'.
20. Provide 100' minimum tangent distance between reverse curves on local and collector streets.
21. Right of way shall be dedicated in accordance with Tempe's Standard Details.

C. DESIGN OF CURB, GUTTER, SIDEWALK, & PAVING

1. The engineer shall provide sufficient cross-sections and/or profiles of existing and proposed improvements.
2. Single family residential development shall have 4" roll curb and gutter, arterial streets shall have 7" vertical curb and gutter and all other streets shall have 6" vertical curb and gutter.
3. Provide sufficient information showing existing upstream and downstream construction to justify the design.
4. The proposed paving grades shall match existing or proposed improvements both upstream and downstream.
5. The design grades shall match the existing or proposed improvements on the opposite side of the street.

6. Wing type driveway entrances shall be located on all streets except for local residential streets with roll curb in front of single family development and where approved by the Engineering Division.
7. Sidewalks are required adjacent to both sides of all city streets and shall be 8' wide along arterial streets, 5'-6" wide on L-1 streets, and 6'-0" wide for all other streets.
8. Select material used in accordance with City Details for base course shall be verified by soil tests.
9. A soil report shall be submitted to verify the designed pavement section.
10. All irrigation ditches shall be tiled appropriately.
11. The engineer shall furnish satisfactory information to permit abandonment or relocation of existing irrigation facilities.
12. If the existing irrigation is proposed to be altered in any way, the engineer shall submit a letter, which verifies that provision for both delivery, and tailwater will be adequate.
13. All pavement termination or extent of overlay shall be determined in the field by the City Engineer.
14. Excessive downhill gradient from an existing or proposed street intersection to a point where minimum gradient is used along the remainder of the street length will not be permitted. A straight grade must be used unless it will create a difficult problem in terms of grading or drainage.
15. Minimum street grade shall be $S=0.0020$ ft./ft. Where practicable street gradients shall exceed minimums ($S=0.004$ ft./ft. is desirable). Maximum street grade for collector streets is 0.07 ft./ft. and for local streets it is 0.09 ft./ft.
16. The minimum length for a vertical curve is 100'.
17. Minimum cross slope shall be 0.025 ft./ft. for all streets and alleys.
18. Minimum longitudinal slope across valley gutter shall be $S=0.0020$ ft./ft.
19. Minimum elevation difference from radius point of cul-de-sac to highest gutter shall be 0.5'.
20. Minimum slope on paved alley shall be $S=0.0020$ ft./ft.
21. Minimum slope on A.B.C. surfaced alleys shall be $S=0.0015$ ft./ft.
22. Show all proposed valley gutters, aprons, catch basins, scuppers, and other

drainage structures.

23. Handicap ramps are required at all intersections.
24. Show all curb transitions.
25. Show invert elevations, pipe size, slope, hydraulic grade line, stationing, and material for all proposed storm drains.
26. All catch basins are to be curb opening type (5.5' minimum length). No grate type catch basins shall be used. Slotted drain with angled slots may be used in combination with catch basins.
27. Scuppers will be considered only if catch basins are not hydraulically feasible on an engineering basis. Replacement of existing scuppers with catch basins is encouraged.
28. Call out all M.A.G. and Tempe Details or show "special" detail on plan.
29. Show all underground electric circuits, conduit, traffic signal poles, pole foundations, pull boxes and other traffic furniture approved by the Transportation Division.
30. Saw cuts of existing pavement when approved by the City Engineer shall make a neat joint.
31. Private streets shall be entered by wing type driveways from public streets.

STREET NAME SIGN REQUIREMENTS

Procedure for street name sign installation on public streets for new subdivisions.

1. During the development review process, the Engineering Division assigns new addresses to the subdivision.
2. Once addresses are assigned, Traffic Engineering prepares the bill for materials and installation that is sent to the developer. The current rate per intersection is \$115.00, but this amount is subject to change due to material costs.
3. After receiving payment, Traffic Engineering prepares the work order to initiate sign preparation and installation.
4. The City maintains street name signs installed on public streets.
5. Condition of subdivision plat approval is for the developer to pay for new street name signs.

Procedure for street name sign installation on private streets for new subdivisions.

1. The developer shall install private street name signs in accordance with City of Tempe Detail T-655, available from the Engineering Division.
2. The developer is responsible for sign preparation and installation.
3. The neighborhood association maintains street name signs installed on private streets.
4. Prior to clearance for occupancy, street name signs shall be installed per City requirements.

SEWER DESIGN CRITERIA

A. GENERAL

1. Include all applicable standard specifications and standard details on the plan.
2. Include the current general notes on the plan.
3. Include the completed utility approval block on the plan.
4. Include the permit and as-built information note.
5. Include approval blocks for the Maricopa County Department of Environmental Management and the City Engineer. Sewer plans shall be approved by the Maricopa County Department of Environmental Management prior to approval by the City Engineer.
6. Benchmark shall be on City of Tempe datum. Horizontal control will be the same as the subdivision plat datum.
7. Show a north arrow on each sheet of plans pointing up or to the right.
8. Include an index map showing the sheet numbers, pipe sizes, pipe type, manholes and cleanouts on the cover sheet.
9. Include a site location map.
10. Show, locate, and dimension all existing and proposed utilities on the plan including rights-of-way and easements.
11. If any lines are located within the jurisdiction of the State or County, their permit is required.
12. Plan and profiles are required for all public sewers showing existing and proposed surface grades.
13. Provide a service stub for each lot in the subdivision and extend it to property line or easement line. Show station, location, and elevation for each service.
14. Access to all sewer mains for maintenance purposes shall be provided.
15. All plans must be submitted on 24" x 36" mylar sheets only and be legible at 50% reduction.

16. All sheets shall be stamped, signed, and dated by an Arizona Registered Professional Engineer.
17. Provide an estimate of quantities of construction items.
18. The maximum scale for sewer plans is 1" = 30'; show a bar scale on each plan sheet.
19. On each sheet show the Engineering Private Development Project Number (assigned during the first review) in the lower right hand corner in the bottom margin. Use 36 pt. Helvetica Kroy or 350 CL Leroy Lettering.
20. Provide title block on each sheet showing project name, type of drawing, sheet number, and quarter section.

B. PIPES

1. The minimum design velocity shall be 2'/sec. with $n = 0.013$ for all pipe materials, unless otherwise approved by City Engineer.
 - a. The minimum grade for 8" sewers is 0.33%.
 - b. The minimum grade for 10" sewers is 0.24%.
 - c. The minimum grade for 12" sewers is 0.20%.
2. The sewer system shall be extended to serve adjacent property.
3. Include street centerline station and offset dimension from street centerline to main at manholes and all changes in alignment.
4. Include sewer line station at centerline of each manhole.
5. Include distance between manhole/centerlines.
6. Include calculated slope between manholes.
7. Include sewer line stationing and elevation at property line at centerline of each service tap at 90° to main; if not installed 90° to main, station, and offset to end of each service tap.
8. The maximum sewer velocity is 7'/sec.
9. Sewer lines shall be deep enough to have a minimum of 5' of cover at the property line.

10. All parallel water and sewer lines shall be separated by a minimum horizontal distance of 10'.
11. Specify encasement M.A.G. Standard Detail 404 on the plans for water line and sewer line encasement when any sewer line crosses above a water line.
12. Specify encasement M.A.G. Standard Detail 404 on the plans for waterline and sewer line encasement when any sewer line is located less than 10' horizontally and 2' vertically under a water line.
13. All pipe shall be V.C.P. unless matching P.V.C. at the downstream match point. In these cases, the existing material can be extended. All plans shall specify the exact pipe to be used.
14. All street crossings shall be bored and encased per Tempe Standard Detail T-215.
15. All street cuts shall be approved by the City Engineer and where approved, trench, backfill, and pavement replacement shall conform to Tempe Standard Detail T-450.

C. MANHOLES

1. The maximum distance between manholes is 400 ft. for 8" to 12" sewer and 500' for sizes larger than 12".
2. Show all rim elevations and pipe invert elevations at manholes.
3. Maintain an invert drop of 0.1', minimum for angle deviations 45° or larger across each manhole.
4. All changes of gradient or direction shall occur with a manhole at the point of change.
5. A manhole shall be provided for all sewer intersections 8" or larger.
6. Use drop manholes only when absolutely necessary and conform to M.A.G. Standard Detail No. 426.
7. All other manholes shall conform to M.A.G. Standard Detail Nos. 420, 421 and 422.
8. No service taps are allowed into manholes or cleanouts.
9. The maximum distance from a cleanout to the nearest manhole is 150'.

10. Use a 30" manhole cover where the sewer is larger than 24".
11. Use a 30" manhole cover where the sewer is more than 10' deep.
12. Use a 30" manhole cover on all lift stations.
13. All manholes shall be 5' diameter with no steps.
14. All manhole installations shall be complete in place including all excavation, backfill, sweeps, and conduits necessary to complete the installation of the manhole and connections to the mainline conduits.

D. SYSTEM ANALYSIS

1. The maximum sewage generated by a site shall not exceed 1760 gal/acre/day for industrial or commercial zoning unless otherwise approved by City Engineer.
2. The peaking factor shall be 2.5.
3. Manning's friction factor shall be 0.013 regardless of material of pipe construction.

4.	<u>Facility</u>	<u>Sewage Generated</u>
	Office	20 Gal/Cap/Day, 150 S.F./Cap
	Theater	5 Gal/Seat/Day
	Hotel	130 Gal/Day/Room
	Retail	1 Gal/S.F./Day
	Restaurant	30 Gal/Day/Seat
	Single Family	100 Gal/Cap/Day, 3.5 Cap/Unit
	Multi Family	100 Gal/Cap/Day, 2.3 Cap/Unit

WATER DESIGN CRITERIA

A. GENERAL

1. Call out or show all applicable standard specifications and standard details on the plan.
2. Include the current general notes on the plan.
3. Include the completed utility approval block on the plan.
4. Include the permit and as-built information note.
5. Include approval blocks for the Maricopa County Department of Environmental Management and the City Engineer.
6. Include a site location map.
7. If any lines are located within the jurisdiction of the State or County, a permit is required.
8. Benchmark shall be on City of Tempe datum. Horizontal control will be the same as the subdivision plat datum.
9. Show a north arrow on each sheet pointing up or to the right.
10. Include an index map showing sheet numbers, valves, fire hydrants, and pipe sizes on the title sheet.
11. Show, locate, and dimension all existing and proposed utilities on the plans including rights-of-way and easements.
12. The maximum scale for water plans is 1" = 30'; show a bar scale on each plan sheet.
13. Each lot in a subdivision shall be supplied with water in sufficient volume and pressure for domestic use and fire protection. Locations of all taps shall be dimensioned on the plans.
14. All plans must be submitted on 24" x 36" mylar sheets only and be legible at 50% reduction.
15. All sheets shall be stamped, signed, and dated by an Arizona Registered Professional Engineer.
16. Provide an estimate of quantities of construction items.

17. On each sheet show the Engineering Private Development (EN) Number and the Development Services (DS) number (assigned during the first review) in the lower right hand corner in the bottom margin. Use 36 pt. Helvetica Kroy or 350 CL Leroy Lettering.
18. Provide title block on each sheet showing project name, type of drawing (water), sheet number, and quarter section.

B. PIPE

1. All pipe shall be ductile iron Class 52 and shall be wrapped in high-density polyethylene in accordance with MAG Standard Specification 610 (PVC used only for non-potable water systems).
2. All section and mid-section water lines shall be 12".
3. All sixteenth lines shall have 8" waterlines.
4. Water lines smaller than 12" shall have a minimum cover of 36".
5. Water lines 12" and larger shall have a minimum cover of 48".
6. Fire protection water flows may increase line sizes and require line looping.
7. All fire hydrant valves shall be flanged to the tee or 90° elbow.
8. Main line valves shall be spaced every 500' to 600' and placed in locations, which allow appropriate water main isolation.
9. All valve boxes shall be per M.A.G. Standard Detail 391-1, Type "C". Deep shouldered non-locking valve box covers are preferred except in heavy traffic areas where pentagonal bolted lids are required.
10. Main line valves at line intersections shall be flanged to fittings.
11.
 - a. Show street centerline station and offset dimension to:
 - I. All fire hydrants and fittings (i.e. valves, tees, ells)
 - II. Main at all changes in alignment.
 - III. All horizontal control points (i.e. centerline intersects, pc, pt).
 - b. Show centerline station and offset to each service tap; size of tap and dimension to nearest side property line.
 - c. Show centerline station, offset and elevations to all changes in vertical alignment (i.e. dips, bends, etc. required to avoid conflicts with other utilities).

12. All parallel water and sewer lines shall be separated by a horizontal distance of 10'.
13. Encasement M.A.G. Standard Detail 404 shall be specified for water line and sewer line encasement when any sewer line crosses above a water line.
14. Encasement M.A.G. Standard Detail 404 shall be specified on the plans for water line and sewer line encasement when a sewer line that is located less than 10' horizontally and 2' vertically under a water line.
15. A M.A.G. Standard Detail 390, Type "B" curb stop with flushing pipe shall be shown at the end of all dead-end lines.
16. All water services over 1" shall be installed by City of Tempe forces. All services on existing water lines shall be installed by City of Tempe forces.
17. No water service permitted on dead-end lines.
18. All street crossings shall be bored and encased per Tempe Standard Detail T-215.
19. All street cuts shall be approved by the City Engineer and where approved, trench backfill and pavement replacement shall conform to Tempe Standard Detail T-450.

C. FIRE HYDRANTS AND SPRINKLER LINES

1. Fire hydrant spacing for one and two family dwellings shall not be over 500' measured along street lines with a minimum fire flow of 1000 GPM and a residual pressure of 20 psi for the most remote location.
2. Fire hydrant spacing for multi-family developments shall not be over 375' apart, or 150' to any opening in the building.
3. Fire hydrant spacing for commercial and industrial areas shall not be spaced over 375' apart, or 150' to any opening in the building.
4. Fire Department connections (FDC's) for sprinkler systems shall be located within 150' of a fire hydrant.
5. Along arterial streets, hydrants shall be spaced 500' (maximum) apart on both sides of the street and arranged in an alternating pattern.
6. The number of hydrants available to a building complex or subdivision (other

than one and two family subdivisions) shall not be less than that determined by the spacing requirements of Table I.

7. The minimum fire flow for buildings other than one and two family dwellings shall be not less than that specified in Table II.

D. WATERLINE CONSTRUCTION

1. The contractor shall take every precaution to prevent foreign material from entering the pipe while it is being stored.
2. During installation and at all times when pipe laying is not in progress, the open ends of the pipe in the trench shall be closed by a water-tight plug or other means approved by the City of Tempe Engineering inspector. If in the opinion of the City of Tempe Engineering inspector the pipe contains dirt that will not be removed during the flushing operation, the interior of the pipe shall be cleaned and swabbed, as necessary, with a .005 to .010 percent chlorine solution.
3. Only City of Tempe Water Management Division personnel shall operate existing valves or any valves connecting new work to the existing system.
4. After pressure testing and before placing in service, all water lines shall be disinfected and tested for water quality in accordance with MAG Standard Specifications Section 611. If the waterline fails, the chlorine residual test or fails to meet the water quality test more than three (3) times, the City of Tempe Engineering inspector reserves the right to require the installed waterline to be cleaned by pigging the line, in accordance with standard procedures, at no cost to the City.

TABLE I
NUMBER AND DISTRIBUTION OF FIRE HYDRANTS

Fire Flow Requirement (GPM)	Minimum No. of Hydrants	Maximum Spacing Between Hydrants (in feet) 1,2,4
500 – 1000	1	375
1250 - 2225	2	375
2500 - 2750	3	375
3000	3	375
3250 - 4250	4	350
4500 – 5000	5	300
5250 - 5750	6	300
6000 - 6250	6	250
6500 - 7000	8	250
over 8000	1/1000 GPM	250

1. Reduce spacing by 100' for dead end fire apparatus access roadways.
2. Where streets are provided with median dividers which can be crossed by fire fighters pulling hose lines, or arterial streets are provided with four or more traffic lanes and have a traffic count of more than 30,000 vehicles per day, hydrant spacing shall average 500' on each side of the street and be arranged on an alternating basis up to a fire flow requirement of 7000 GPM and 400' for higher fire flow requirements.
3. One hydrant for each 1000 GPM or fraction thereof.

Where new water mains are extended along a street where hydrants are not needed for protection of structures or similar fire problems, fire hydrants shall be provided at intervals of not less than 1200' spacing to provide for transportation hazards.

PEDESTRIAN, BICYCLE, TRANSIT DESIGN CRITERIA

A. GENERAL REQUIREMENTS

1. Plans submitted for review shall show all existing bus bays, bus stops, shelters, furniture, and easements within 250' of the site.
2. Plans submitted for review shall show all existing bicycle and pedestrian paths, easements, and facilities within 250' of the site.
3. Plans submitted for review shall include a pedestrian plan indicating proposed circulation within the site and access from the streets abutting the site. Pedestrian plans must conform to Americans with Disabilities Act (ADA) requirements.

B. GUIDELINES FOR DEDICATIONS AND IMPROVEMENTS

1. Development of parcels located at far side of arterial to arterial and arterial to collector intersections shall be required to dedicate minimum easements of 9' by 27' for transit shelters and 11' by 175' for bus bays per the City's exaction policy.
2. Development of parcels located along multi-use paths designated by the most recent adopted Tempe Bicycle Plan and Updates may be required to dedicate a 25' easement per the City's exaction policy.
3. Bus shelter and bus bay improvements shall conform to City of Tempe Standard Detail T-654 specifications.
4. Multi-use path improvements shall conform to City of Tempe Standard Detail T-656 specifications.

C. TRANSIT RELATED DESIGN CRITERIA

1. Building frontages and location of main building should be oriented towards arterial streets or streets with existing or planned transit service (all arterial and collector streets).
2. Bus stops shall be integrated into the overall pedestrian plan of any project. Pedestrian walkways shall be designed to provide a direct connection between the main building entrance to public sidewalks and transit stops. Landscaping plans shall be designed to provide shading to the pedestrian walkways.
3. Pedestrian and transit user access to buildings is encouraged by locating buildings at the minimum setback at arterial to arterial intersections and arterial to collector intersections, or where transit service is provided or planned (all arterial and collector streets).

Distance of pedestrian access from bus stops to building entrances shall be minimized by using minimum setback requirements for locations of buildings on the site.

4. Pedestrian and bicycle access to the main building entrances from all sides of the site by providing more links to street frontages. At a minimum, it is suggested that pedestrian and bicycle ingress and egress pathways into the site shall be equal to the number of proposed driveways.
5. It is desirable that buildings locate closer to the street intersection by minimizing parking at street frontages or locating all parking behind or to the side of the building.
6. Bus stops shall be located between 60' and 110' from point of tangency of the intersection curb return.
7. Furniture installed at bus stops shall be located so as to provide minimum 36" clearance for access and maintenance between components and switch boxes, mailboxes, and utility boxes. All bus stops shall meet current ADA requirements for transit.
8. Bus stops shall be provided with convenient and safe pedestrian access to and from building entrances to streets. It is recommended that driveways not be located within a bus stop and/or pullout area.
9. The landscape plan shall incorporate shade trees for bus stops, maximizing shading for summer morning and afternoon hours. All landscaping provided shall be located so as not to obstruct the shelter canopy or visibility of the bus stop.
10. Mixed-use development is encouraged, allowing people to work and play where they live.
11. New and existing cul-de-sac and dead end streets, especially those abutting arterial and collector streets, should provide connecting pedestrian and bike paths to the major streets. Cul-de-sacs and dead-end streets are not encouraged for new or re-development.
12. Pedestrian and bicycle access to alleys shall be encouraged. Pedestrian and bicycle access to alleys may provide additional means for those users to access arterial streets.

D. BIKE FACILITIES

1. Bike racks shall be installed near main building entrances and located to take advantage of available building shade.
2. Provide direct access to the site from designated multi-use paths and other bike facilities abutting the site.
3. Bicycle rack design and installation shall conform to the City of Tempe Standard Detail T-578.

E. AMERICANS WITH DISABILITIES ACT (ADA) ACCESS

1. Sidewalks shall be required on all streets surrounding the property, including industrial, commercial and residential developments.
2. Sidewalks and pedestrian paths shall be built in compliance with the requirements of the Americans with Disabilities Act.
3. Ramps shall be provided at all street corners abutting the property.
4. A minimum 8' X 8' concrete clear area adjacent to the curb shall be required at all bus stops. Bus stops in areas with sidewalks less than 8' wide or with sidewalks separated from the curb shall be upgraded to meet the minimum clear area per the City's exaction policy.

DRAINAGE REQUIREMENTS

In accordance with Ordinance No. 819.1 adopted by the Tempe City Council on April 21, 1977 and Ordinance No. 93.03, adopted February 11, 1993, the following criteria are established to provide proper measures for handling and disposal of storm water runoff. Requirements for specific development (subdivision, offsite) will be determined by the applicable criteria.

A. HYDROLOGY REPORTS

Flows (Q's) should be calculated for the 100 year storm according to the methods outlined in the Hydrologic Design Manual published by the Maricopa County Flood Control District. The rational method may be used for areas of 160 acres or less. At the option of the Engineer, the Maricopa County Flood Control District Hydraulic Design Manual may be used to determine required retention volumes.

1. Subdivisions

Preliminary hydrology report must be submitted with the preliminary subdivision plat. A contour map will be required with the report showing the existing drainage of the property (channels, ditches, structures, overland flow, etc.), including any drainage crossing the property from upstream areas. Another map shall show the proposed subdivisions runoff Q's, points of concentration, limits of each drainage area, location and size of storm sewers and catch basins. For retention, show volume of water required to be stored, location of storage, and method of disposal. A final hydrology report must be provided before construction plans will be reviewed. The report will show:

- a. A complete runoff analysis in tabular form.
- b. Points of concentration with peak street flows and drainage areas.
- c. Calculation for sizing catch basins, pipe, and locating catch basins.
- d. Retention basin characteristics.
 - I. Inlet structure.
 - II. Detailed calculation of volume required and actual holding volume.
 - III. Calculation and verification for disposing of water within thirty-six (36) hours.
- e. Calculations of 100-year runoff at critical points of subdivisions (low points/constrictions to overland relief).

- f. Maximum elevation difference shall be 1' between adjacent residential finished floors not separated by a street.

2. Commercial and Industrial

For developments not requiring a subdivision map, such as a lot, tract, or individual parcel the Hydrology and Retention Volume calculations shall be put on a "Grading & Drainage Plan". The plan and calculations must contain the following:

- a. Hydrology and Retention calculations for a one hundred year storm including:
 - I. Volume required
 - II. Volume retained
- b. General Notes for Grading and Drainage.
- c. Easily identified retention areas, fully dimensioned with high water elevation called out. The lot outfall is to be .30' above design high water elevation. (Section views as required for clarity).
- d. Retention Basin Volume calculations easily verified and shown by basin.
- e. When paved areas are incorporated into lot retention, water depth is not to exceed 1.0'.
- f. Finish floor elevation is to be a minimum of 12" above the highwater design and 8" above the lot outfall.
- g. Some acceptable method of dissipating storm water within a 36-hour period. If a drywell is to be used, the drywell volume can be included in the calculations for volume provided. A drywell is required for dissipation whenever paved areas or basins greater than 1.0' in depth are incorporated into retention. No allowances for volume due to percolation rate will be given. See Section IV (D) for drywell limitations. Retention areas at locations involved in fuel dispensing shall use Envibro Drywells or equal.
- h. Drywells must penetrate a minimum of 10' into suitable permeable strata.
- i. Drywell grates shall be 0.5' above basin bottoms.
- j. Drywells must be registered with the Arizona State Department of Environmental Quality. An Aquifer Protection Permit (APP) may also be required.

B. STREET AND STORM DRAIN DESIGN

1. The Maricopa County Flood Control District Hydrologic Design Manual or the Rational Method using the charts and nomographs in this section (Figures I-III) for determining peak runoff for subdivisions shall be used.

Note: A composite C value is to be used for storm drain design purposes only. Required retention volume is calculated in accordance with Section IV, Retention Design Criteria.

2. Rainfall intensity is related to time of concentration. Time of concentration is the summation of Overland Flow Time, Street Time and Pipe Time.
 - a. Overland Flow Time is that time required for a drop of water falling on an open area (lawn, field, etc.) to reach an outlet point (street, ditch, pipe, etc.) Smaller lots, larger building footprints, and increasing non-pervious services (roots, driveway, patio, etc.) require overland travel time of 10 minutes maximum.
 - b. Street Time is that time required for the runoff to travel from entrance onto the street to entrance into a catch basin, drainage channel (or to some other point along the street where the runoff exits from the street).
 - c. Pipe Time is that time required for the runoff to travel in the pipe from the entrance catch basin to another point along the storm drain - usually an entrance structure for another drainage area, retention basin, drainage channel, etc.

The time of concentration shall be arrived at in the following sequence:

- I. Overland Flow Time refer to paragraph II.B.1 and Figure 1.
- II. Street Time is computed by dividing the length of street flow by the runoff velocity when flowing at top of curb. Velocity shall be computed using Manning's equation with $n = .015$.
- III. Pipe and channel flow shall be computed using the velocity occurring at design flow in a pipe or channel of given size and material. Velocity shall be computed using Manning's equation with the "n" value for pipe of 0.012.

Refer to any published table of values for "n" values of channels.

C. DESIGN STORM:

Streets, catch basins and storm sewers shall be designed for a ten-year storm. When the computed runoff exceeds the capacity of a street (where the depth of flow is at the top of curb) subsurface drainage will be required. Note: The most common error is the overloading of one side of a street where the majority of runoff is placed on one side of the street and the capacity is considered for both sides. Valley gutters will not be permitted across midsection collector streets or arterial streets. 4" roll curb is required in single family residential development. Valley gutters will be discouraged on other collector streets. Peak flows from a 100-year storm must be carried within the cross section between buildings (front yards and streets).

Storm drains shall be designed to provide the required capacity without surcharging the line. Storm drain outlets shall be designed to function as a part of the ultimate drainage system.

Effective drainage will be permitted during the interim of development and construction of a completed storm drain system. Storm sewers shall not be designed with less than a velocity of 3 fps. No pipe shall be less than 18" in diameter. When a pipe size has been established, it shall not be reduced, unless for a metered situation. Maximum manhole spacing for 36" pipe or less is 600' and above 36" is 800'. Manholes will be required at a change of grade, change of pipe size, or alignment. Curved pipe will not be permitted for 36" pipe or less. Catch basins shall be designed to intercept a minimum of 80% of the total runoff delivered to the point in the street where depth of street flow reaches curb height. Sump catch basins shall be designed to receive all of the runoff at the catch basin. In situations where catch basins are sumped, the Engineer will verify that overland relief for the 100-year storm is available without damage to buildings. Catch basin capacities shall be determined from Hydraulic Engineering Circular No. 12 (HEC-12) published by the Federal Highway Administration or the Maricopa County flood Control District Hydraulic Design Manual. No grate type catch basins are permitted. Length of curb opening shall be 5.5' minimum. Slotted drain with angled slots (minimum length - 10') may be used in combination with catch basins.

D. Retention Design Criteria

1. Retention onsite of the 100-year 1-hour storm is required.
2. Method of Storage
 - a. Individual lot storage shall consist of providing adequate storage volume for the lot, plot or parcel of land using method in part IV C.1. Storage volume shall include adjacent streets and alleys except for arterial streets. Although Ordinance 819.1 allows a maximum depression of 8" for single family lots, experience with depressed lot construction and maintenance shows that normal rounding of typical confined yard depressions results in an average of 6" throughout the basin bottom area.

Therefore, the maximum allowable depth of water for calculation of retention volume provided for single family residential lots will be 6", even though the plans specify depth of 8". Subdivisions of less than 18,000 sq.ft. lot (single family zoning) will be required to utilize combination storage. The perimeter and house-footing berm configurations shall be submitted with the final hydrology to substantiate the retention volume provided (Fig. III) - Individual storage over 1.0' in depth will require a disposal mechanism to meet the 36 hr. criteria.

- b. Central storage shall provide adequate volume to handle the 100-year, 1-hour storm runoff from the property being developed. In the case where the central basin will remain as private ownership, it will be required that such property be set aside for drainage purposes per easement, see Figure IV. All maintenance and operation shall be the responsibility of the owner of the property. In the case where the central storage will be dedicated to the City for public use, an easement for the drainage area will be required. (Figure V)

The City may require the owner to comply with the following conditions:

- I. Construction of drywells as necessary to dispose of nuisance water.
 - II. Seeding to provide ground cover.
 - III. Construction of flood irrigation and/or sprinkler systems.
 - IV. Other construction as the City may deem necessary to the proper public use of the property.

Upon acceptance of the dedication and the completion of the required

construction, the City will assume responsibility for operation and maintenance. Design of such storage is outlined in the following section (D-3).

- c. Combination storage shall consist of providing retention on individual lots and the balance of the 100 year, 1 hour storm (2.4 inches) within a central storage area. See subsection IV. B.1. for onsite retention and the above subsection (D.2.6) and following section (IV. C.) for central storage. The “C” factor is the non-absorption factor of (.95) on the onsite lot area and the run-off factor for the right-of-way water contributing to the central storage.

- I. Where a residential subdivision is designed using combination storage, the entire volume of water generated minus the amount held by the depressed lots is the amount of central storage required.

- II. Rear yard retention will only be allowed on lots of 6500 square feet or greater. Rear yard retention is difficult to surveil after occupancy and experience has shown that spas, pools, patios, gazebos, garages, storage buildings and other amenities regularly usurp original depressed on lot storage. Therefore a “coefficient of build-out” will be applied to the proposed retention volume to reduce it to 40% of the original rear yard retention volume.

- III. Finish floor elevations for single family residences to be a minimum of 14” above outfall of lot per Figure III.

- 3. The design of the central storage retention facility shall conform to the following:

(Engineers, may at their option, use the MCFCD Hydrology Design Manual to determine required retention volumes. When the MCFCD Manuals are used for retention volume calculations, note that the 100 year, 2 hour storm is used along with variable “C” factors. Standard City of Tempe freeboard requirements shall still apply.)

- a. Determine volume:

$$V = \frac{(D)}{12} AC$$

V = volume (ft)

A = area (ft), total area of development excluding arterial right-of-way only

D = depth of water required to retain (2.4 inches)

C = retention non-absorption coefficient (.95)

- b. All central storage basins must drain towards outlet.
- c. The typical maximum side slope is 4:1; City parks require flat bottoms (irrigation) & 10:1 side slopes. Private retention basins utilized for recreation require maximum 5:1 side slopes. Minimum bottom grade is 1%, except at City parks.
- d. Maximum depth of water in central storage basins shall be 3'
- e. Retention areas shall not occupy more than 67% of the onsite landscaped street frontage areas.
- f. In the Rio Salado Overlay District and the Southwest Overlay District, the first 10' of onsite street frontage landscaping shall not be used for retention purposes (use 5:1 slopes maximum for residential and recreational purposes, use 4:1 for industrial areas).
- g. Provide a minimum of 1' freeboard above the high water design elevation on all sides of the retention area, including lowest development gutter flow line.
- h. Wherever possible, overland relief must be provided.
- i. Discharge requirements:
 - I. Retention volume must be disposed of in 36 hours.
 - II. Basins greater than 1' in depth will require a drywell or other approved disposal mechanism.
 - III. Basins less than 1' in depth may require a drywell or other approved disposal mechanism.
- j. Drywells will be permitted, pending approval by State Dept. of Environmental Quality, for disposal of water, however, no percolation rate will be considered for reduction of retention volume.
- k. Invert of inlet pipe shall not be lower than bottom of retention facility at point of entrance unless otherwise approved.

- l. Inlet and outlet structures shall have a 6' wide concrete apron at the opening and shall be constructed to prevent easy access (children).
 - m. When the Maricopa County Flood Control District Hydrology and Hydraulic Design Manuals are used for retention volume calculations, note that the 100 year-2 hour storm is used along with variable "C" factors. Standard City of Tempe freeboard requirements still apply.
- 4. NPDES (National Pollutant Discharge Elimination System) regulations require the City of Tempe to promulgate a storm water management system that regulates quality as well as quantity. The statute is Section 402(p) of the Water Quality Act of 1987. In August 1998, the City Council adopted amendments to Chapter 12 of the Tempe City Code by adding Article VI.

Drainage plans shall implement the following design parameters.

- a. No drywells allowed in paved areas.
- b. No direct connections allowed to drywells.
- c. No drywells or other outlets allowed in truckwells.
- d. Truckwells shall not be designed to accept flow from other areas of the site. Provide sump pump with manual switch for draining truck wells.
- e. Generally, retention basins shall have grass bottoms, unless otherwise approved on Engineering drawings. Turfed basins greater than one foot in depth will require a single chamber drywell similar to the Maxwell IV. If a surface treatment other than turf is used, regardless of the depth, a 2-chambered drywell system similar to the Maxwell Plus System will be required. Retention areas 1 ft. deep or less with no grass in the bottom in commercial/industrial developments require drywell access.
- f. No direct connections from catch basins/pipes to drywells.
- g. No subsurface retention facilities allowed.
- h. Interceptors for commercial/industrial/multi-family developments may be required to filter and treat runoff.
- i. The City wants to reduce water uses where-ever possible.
- j. If turf landscaping is not provided in commercial or industrial sites, special two-chambered mechanical filtering drywell mechanisms (Maxwell Plus or equal) shall be used.
- k. The above surface retention requirements avoids unnecessary "out of site-out of mind" maintenance/monitoring requirements to avoid

groundwater contamination in the future.

- l. In the Southwest Tempe Overlay District or the Rio Salado Overlay District, the first 10' onsite street frontage landscaping shall not be used for retention purposes.
- m. Retention areas shall not occupy more than 67% of the on-site street frontage landscape area.
- n. All retention areas shall maintain slopes no steeper than 4:1.
- o. All on-site water retention areas, other than paved surfaces shall be entirely landscaped.
- p. The City does not allow underground storm water retention without the specific written approval of the City Engineer.

SAMPLE FORM

E A S E M E N T

For valuable consideration, JOHN DOE AND MARY DOE, his wife, or XYZ Corporation, hereby grants to the City of Tempe a municipal corporation of the State of Arizona, an Easement for the central storage and disposal of storm water runoff and subject to the following terms and conditions, over, under and across the following described property situated in Maricopa County, State of Arizona, to-wit:

DRAINAGE AREA

Parcel No. 1

(Legal description of property from which storm water runoff allowed to drain to Central Storage Basin)

(Legal)

CENTRAL STORAGE BASIN

Parcel No. 2

(Legal Description of Central Storage Basin)

(Legal)

This conveyance is made upon the following expressed conditions:

1. That said John and Mary Doe or the XYZ Corporation is--are responsible for the construction and perpetual maintenance of the Central Storage Basin in accordance with standards established by the Tempe City Engineer pursuant to Ordinance No. 819.1;
2. No buildings or structures of any sort may be constructed within the CENTRAL STORAGE BASIN, nor any deviations from the approved Drainage Plan showing existing and proposed grades together with calculations showing the volume of storage required and provided within the Central Storage Basin or which may impede the

flow of water to the Central Storage Basin.

3. The property, as more particularly set forth above, shall be used for the purposes stated so long as such use is required by the City of Tempe;

4. All the terms and provisions of Ordinance No. 819.1 are expressly incorporated herein by reference.

5. That all or any part of this easement may be abandoned through the City Code abandonment process.

The rights and obligations, as more particularly set forth herein, shall be binding upon the heirs, successors in interest or assigns of the parties hereto.

Dated this ____ day of _____, _____.

John Doe

Mary Doe

XYZ Corporation

CITY OF TEMPE

By _____

By
Mayor

STATE OF ARIZONA)
) ss
COUNTY OF MARICOPA)

The foregoing instrument was acknowledged before me this
day of _____, _____, by _____.

My Commission Expires: _____

Notary Public

STATE OF ARIZONA)
) ss
COUNTY OF MARICOPA)

The foregoing instrument was acknowledged before me this
day of _____, _____, by _____,
Mayor of the City of Tempe, a municipal corporation of the State of Arizona, on behalf of the
corporation.

City Clerk

SAMPLE FORM

EASEMENT

For valuable consideration, JOHN DOE AND MARY DOE, his wife, or XYZ Corporation, hereby grants to the City of Tempe, A municipal corporation of the State of Arizona, an Easement for the disposal of storm water runoff and subject to the following terms and conditions, over, under and across the following described property, situated in Maricopa County, State of Arizona, to-wit:

DRAINAGE AREA

(Legal description of property from which storm water runoff allowed to drain to Central Storage Basin).

(Legal)

This conveyance is made upon the following expressed conditions:

1. No deviations from the approved Drainage Plan showing existing and proposed grades together with calculations showing the volume of storage required and provided within the Central Storage Basin.
2. The property, as more particularly set forth above, shall be used for the purposes stated so long as such use is required by the City of Tempe;
3. All the terms and provisions of Ordinance No. 819.1 are expressly incorporated herein by reference.
4. That all or any part of this Easement may be abandoned through the City Code abandonment process.

The rights and obligations, as more particularly set forth herein, shall be binding upon the heirs, successors in interest or assigns of the parties hereto.

Dated this _____ day of _____, _____.

John Doe

Mary Doe

XYZ Corporation

CITY OF TEMPE

By _____

By
Mayor

STATE OF ARIZONA

)

) ss

COUNTY OF MARICOPA

)

The foregoing instrument was acknowledged before me this
day of _____, _____, by _____.

My Commission Expires:

Notary Public

STATE OF ARIZONA

)

) ss

COUNTY OF MARICOPA

)

The foregoing instrument was acknowledged before me this
day of _____, _____, by _____,
Mayor of the City of Tempe, a municipal corporation of the State of Arizona on behalf of the
corporation.

City Clerk

STREET LIGHTING REQUIREMENTS

A. GENERAL REQUIREMENTS

Developers of residential, commercial, and industrial properties are responsible for the design and installation of street lighting in accordance with the standards contained herein. As a part of normal plan processing through the Engineering Section of Development Services, street lighting plans shall be forwarded to the Transportation Division for review and approval.

The plans shall include, but are not limited to, street lighting poles, pole foundations, mast arms, luminaires, receptacles, conduits, pull boxes (J-boxes), and all hardware associated with new or existing street lighting systems. The developer shall provide and install all required street lighting poles, foundations, mast arms, luminaires, receptacles, conduits, associated hardware and pull boxes (J-boxes) as specified. All necessary work shown on the approved plans shall be complete and all lighting systems functional; and all fees and connection charges shall be paid by the developer prior to the utility energizing the system.

1. DESIGN CRITERIA

- a. Design wind speed – 80MPH; 1.3 gusts; 30 feet above ground.
- b. Lighting Levels
Roadway width – variable
Two-sided – staggered opposite side or median (dual mast arm)
Minimal average foot candles – 1.2 f.c.
Uniformity ratio – 4.1

2. LOCATION

- a. Subdivisions – average spacing of 300 feet. Poles located 2 feet back of curb or sidewalk on public right-of-way.

B. PROCEDURES

1. PLAN SUBMITTAL REQUIREMENTS

- a. DEVELOPER
 - I. Submit two (2) sets of scaled site or subdivision plans to the Engineering Section of Development Services showing the proposed street lighting locations. The plans shall include street layout, lot lines, driveways, and all utilities.

- II. Plans shall include the nearest adjacent street lights to the development and the distance to those lights will be noted on the plans, using standard M.A.G. symbols.
- III. Upon receipt of preliminary approval of the street light locations from the Transportation Division, work with the appropriate utility and make payment to the utility for utility design fees for preparing circuit plans. (Utility to design the street lighting electrical circuits). Submit one utility circuit design plan set to the Engineering Section of Development Services and distribute sufficient sets of plans to potential contractors for bid preparation.
- IV. Pay the City, Development Services, all required energy connection, development and construction fees.

b. CITY

- I. Upon initial receipt of the plans from the developer, the Engineering Section of Development Services shall review the submittal for compliance with City codes and standards and provide for final approval.
- II. Upon receipt of the plans from the utility, approval of the plans by the Engineering Section of Development Services, and payment of all fees by the developer, Development Services shall issue appropriate permits.

c. UTILITY

- I. Upon receipt of the approved street lighting plan, the utility shall design the street lighting circuits and assign street identification numbers for each proposed street lighting structure.
- II. The utility shall then provide to the developer, 8 sets of the completed street lighting circuit designs for distribution.

2. UNDERGROUND REQUIREMENTS

a. DEVELOPER

- I. The developer shall perform all the trenching, excavating, and backfilling per current utility company and Maricopa Association of Governments (M.A.G.) specifications.

- II. The developer shall provide and install all conduit with pull wire per current utility company specifications for underground street lighting conductor systems; and bear the cost for the electrical conductor installation and design expenses.
- III. The developer shall install a pull box (provided by the utility company) as near to the base of each pole as practical (not required in Old Towne Special District area).
- IV. The developer shall provide and install all the necessary conductor for a complete installation from the pull box to the luminaire, including pole foundations.

b. UTILITY

- I. The utility shall install the conductors from the source of feed to the pull box as required to serve the specific street lighting plan.
- II. The utility shall make all necessary connections within the pull box.

Note: The point of delivery for underground electric energy service will be at the pull box.

3. OVERHEAD REQUIREMENTS (Special approval required)

a. DEVELOPER

- I. A minimum length of 18" of conductor will be coiled and left by the developer, from the luminaire arm, at the pole attachment.
- II. On joint-use pole installations, the developer shall adhere to current conductor and equipment clearance standards as specified in the National Electrical Safety Code.

b. UTILITY

- I. The utility shall install all conductors from their source of feed to the base of the mast arm and make all necessary connections.
- II. The point of delivery for overhead electric energy service shall be at the base of the mast arm.

4. ADDITIONAL REQUIREMENTS

a. DEVELOPER

- I. The street lighting shall be installed by the developer concurrent with other required off-site and on-site improvements prior to occupancy. Plans submitted to the City will indicate street lighting and will include street light location, luminaire type, lamp type/size, mounting height, and pole type. Street light locations may be adjusted not more than 20' in the field without approval from the Transportation Division. If the approved pole locations require modifications in excess of 20', 2 copies of the revised plans showing new pole locations will be submitted to the Transportation Division for review, and approval. It should be noted, however, that any adjustments or modifications, whether they be in the field or submitted for approval, may incur additional costs from the utility company.
- II. Street lighting structures shall use high-pressure sodium full cut-off luminaires, controlled by individual photocells, mounted on steel poles. The spacing of the poles will be based on light level requirements, type of street, mounting height, type of luminaire, and illumination level requirements contained herein.
- III. All installations shall be in accordance with the National Electrical Code and National Electrical Safety Code, and shall also conform to city laws and codes governing such work.
- IV. Street lights shall be fully shielded in such a manner that light emitted by the fixture, either directly from the lamp or indirectly from the luminaire, is projected below a horizontal plane running through the lowest point on the fixture where light is emitted.
- V. It is the developer's responsibility to call for rough inspection by the City Engineering inspector, on items for which power is requested. The City shall then give the utility company authorization to energize these street lights.
- VI. All street lights shall be connected (by the utility) to the permanent power supply and function properly prior to the final acceptance of the off-site improvements.

Note: Additional costs may be incurred by the developer should the utility company be unable to facilitate the connection for power due to deficiencies in materials and/or workmanship provided by the contractor.

- VII. Trenching, excavating and backfill shall be in accordance with City of Tempe Details T-450 and MAG Specifications Section 601, unless otherwise specified.

Note: For standard type street lighting and architectural type street lighting systems, the developer shall coordinate all trenching requirements with the utility.

- VIII. Conduit under existing streets shall be installed by boring or jacking. All boring or jacking shall comply with the applicable requirements of MAG Specifications Section 602 and the City of Tempe supplement specification, except that steel casing or steel liner plate is not required.
- IX. On each approved set of street lighting plans, all street lighting locations shall be marked with the identifying number, utility index number, and street station. Address and index numbers will be provided to the developer by the City. These numbers are to be used in conjunction with the project name.
- X. The developer is required to install identifying index letters and/or numbers on the street side of each pole (this does not apply to the antique type poles). All letters and numbers shall be 2" high and mounted vertically on each pole with the bottom number placed a minimum of 7' above the base of the pole. The letters/numbers shall be stenciled on the pole using black enamel based paint.
- XI. Prior to energization, test all circuits and grounds for continuity, operate contactors, and control circuits. All systems shall test free of shorts and grounds and shall be free of mechanical and electrical defects. Demonstrate that all equipment furnished and installed and/or completed functions in the required manner.
- XII. It is the developer's responsibility to restore all property (private or public), landscaping, sidewalks, etc. to meet or exceed the original condition that are disturbed during street lighting construction.

- XIII. Street lighting connection charges shall be paid by the developer concurrent with off-site permit fees payable to the City of Tempe, and submitted to the Development Services Center for issuance of permits.
- XIV. The developer shall provide and submit to the City Engineering Division, accurate "As-Built" plans on the approved set of construction plans, prior receiving "Occupancy" approval.
- XV. The developer shall warranty all workmanship for a period of not less than one full year from the date of acceptance by the City.

b. CITY

- I. Should the developer require major modification to pole locations, he/she shall submit two copies showing the modifications to the City for approval. The City shall then submit two copies of the approved revised plans to the utility company for circuit re-design where necessary.
- II. The City shall provide to the utility written authorization for the connection and energization of new street lightings that have been properly installed and have been approved, in writing by a City Engineering inspector.
- III. The City will accept the street lighting system upon verification by the utility, approval by the City Engineering inspector, and successful energization of the system.

c. UTILITY

- I. All connections to the permanent power source and the energization of power to each street light shall be made by the utility serving the area.
- II. The utility shall verify the operation of each street light at the time of connection and energization.

FINAL DECISION REGARDING EXACTIONS/DEDICATIONS

Per the Tempe City Code, the City Engineer is responsible for formulating criteria necessary to enforce the intent of the Code. Typical improvements required for a development include water and sewer extensions, street paving (including curb, street lights, and sidewalks), storm water retention and undergrounding of overhead utilities on or adjacent to the development.

The requirements that you have received on the enclosed marked-up plan include both City Code/Ordinance requirements and policy requirements established by the City Engineer. Exaction (non-ordinance) items are identified by "1a," "1b," etc. through "3i" on the attached matrix. Comments on the marked-up plan identified by "1a," "1b," etc. through "3i" may be appealed. Please see the "Notice of Appeal Rights" for instructions for the appeal procedure.

If you have questions regarding any of the comments, you may contact Jim Bond, Principal Civil Engineer at (480) 350-8897.

Andy Goh, P.E.
Deputy PW Manager/City Engineer

GENERAL NOTES

The notes in this section apply to all other note sections and are compiled here for convenience:

1. All construction under the public Works permit shall conform to the Maricopa Association of Governments Uniform Standard Specifications and Details (MAG Specifications and Details), City of Tempe Supplement to the MAG Specifications and Details, and Tempe Traffic Barricade Manual.
2. A permit issued by the Engineering Division shall be required for all work in the City of Tempe rights of way. An investigation fee, in the amount greater of \$250.00 or double the permit fee, not to exceed \$2,500, will be charged for any work with the City of Tempe rights-of-way in which a permit has not been issued prior to commencement of work.
3. The Engineering Division shall be notified 24 hours prior to starting the different phases of construction for scheduling inspections.
4. Right of way improvements shall not be accepted until 3 mil mylar reproducible “as-built” plans have been submitted to and approved by the Engineering Division.
5. Location of all water valves, manholes, and cleanouts must be referenced at all times during construction and made available to the Water and Wastewater Division.
6. No job will be considered complete until all curbs, pavement, and sidewalks have been swept clean of all dirt and debris and all survey monuments are installed according to the plans.
7. The City will not participate in the cost of construction, utility relocation, construction staking, or as-builts.
8. The contractor shall contact Blue Stake (263-1100) 48 hours prior to construction.
9. All existing street monumentation must be preserved. Prior to construction, monuments will be referenced horizontally and vertically. After construction, monuments shall be reset and field notes, including new elevation, shall be filed with the City.

SITE PLAN NOTES

1. This set of plans has been reviewed for compliance with City requirements prior to issuance of construction permits. However, such review shall not prevent the City from requiring correction of errors in plans found to be in violation of any law or ordinance.
2. The City does not warrant any quantities shown on these plans.
3. The City approval is for general layout in the right-of-way, on-site grading, drainage, and water and sewer. This approval is valid for a period of six months. Construction permits shall be obtained during this period or the plans shall be resubmitted for review and approval. One 6 month extension may be granted, upon request if the request is made prior to the expiration of the six (6) month period at a cost of 25% of the total permit fees.
4. An approved set of plans shall be available on the job site at all times.
5. The City shall be notified 24 hours prior to any construction work. Construction work concealed without inspection by the City shall be subject to exposure at the contractor's expense.
6. Construction items shall not be accepted until 3 mil mylar reproducible "As-Built" plans have been submitted to and approved by the Engineering Division.
7. The developer is responsible for the removal or relocation of all obstructions within the right-of-way prior to starting new construction.
8. The developer is responsible for arranging the relocation and associated costs of all utilities. A utility relocation schedule shall be submitted prior to the start of new construction.
9. The developer is responsible for obtaining or dedicating all required rights-of-way and easements to the City prior to approval of improvement plans.
10. The contractor shall contact BLUE STAKE (602- 263-1100) 48 hours prior to construction.
11. The contractor shall barricade construction sites at all times per the City of Phoenix Traffic Barricade Manual. When required by the City, a traffic control plan shall be submitted for approval in advance of construction.

12. The contractor may obtain a fire hydrant meter for construction water from Customer Services. This meter should be ordered two working days prior to the start of construction. The unlawful removal of water from a fire hydrant is a violation of the municipal code, punishable by fine and/or imprisonment.
13. All broken or displaced existing concrete curb, gutter, or sidewalk shall be removed and replaced as directed by the City of Tempe Engineering Division inspector.

PAVING PLAN NOTES

1. No paving construction shall be started until all underground utilities within the roadway prism are completed.
2. The maximum stake interval for grades of 0.2% or less shall be 25' for concrete work and 50' for asphalt roadway section, except on horizontal or vertical curves where a maximum stake interval of 20' for concrete work shall be required. All curb returns shall be staked at the P.C., P.T. and the midpoint of the return. No grade stake interval shall exceed 50'.
3. Gutters will be water tested in the presence of the City Engineer or his authorized representative to insure proper drainage, prior to final approval by the Engineering Division.
4. Exact point of matching, termination and overlay, if necessary, may be determined in the field by the Engineering Division.
5. Underground street light and traffic signal circuits shall be installed as part of the offsite improvements. New foundations for traffic signal poles shall be poured far enough in advance to allow sufficient time for concrete curing and for scheduling the relocation of the existing traffic signals.

SEWER AND WATER PLAN NOTES

1. The contractor shall uncover all existing lines being tied into to verify their location prior to construction of new lines. The contractor will locate or have located all existing underground pipelines, telephone and electric conduits, and structures in advance of construction and will observe all possible precautions to avoid damage to same. Call Blue Stake at 602-263-1100.
2. Summits in water lines shall be located at fire hydrants.
3. Backfilling shall not be started until lines are approved by the Engineering Division.
4. If a backflow prevention assembly is required to be installed, the contractor will call the Development Services Department at 480-350-8341 for an inspection before backfilling the assembly.
5. All public water lines shall be class 52 DIP, protected with polyethylene corrosion protection per MAG Specification 610.
6. All new water and sewer connections to existing lines shall be bored unless otherwise approved by the City Engineer.
7. All on-site sewer systems are considered private unless otherwise noted on plans and must be approved by the City of Tempe Building Safety Division of the Development Services Department.
8. In accordance with AAC R18-4-119, all materials added after January 1, 1993, which may come into contact with drinking water shall conform to National Sanitation Foundation Standards 60 and 61.
9. All manhole installations shall be complete in place including all excavation, backfill, sweeps, and conduits necessary to complete the installation of the manhole and connections to the mainline conduits.
10. For the existing sewer stub connections only.
"This is to certify that an actual field flow test on the existing sewer stub was performed and was found to be acceptable and free of any obstructions prior to final building connection"

Engineer

Date

Arizona P.E. Number

ON-SITE DRAINAGE PLAN NOTES

1. A Public Works permit issued by the Engineering Division shall be required for the onsite drainage of the project.
2. Prior to acceptance the owner/developer shall furnish the following:
 - a. Drilling log and certification of compliance for all dry wells.
 - b. A 3 mil. double matte, black and white reproducible mylar copy of the approved plans with this certification signed by a registered professional engineer:
3. "This is to certify that an actual field survey was made under my supervision of the subject site and that finish floor and retention elevations are the true "As-Built" conditions, and they meet or exceed the original retention requirements as shown on this approved plan."
4. Underground storm water storage systems, when used and specifically approved in writing by the City Engineer, shall be the sole responsibility of the owner, including the design, construction, inspection, monitoring and maintenance. The owner shall be liable for any and all claims resulting there from. The City of Tempe, by allowing this system assumes no liability or responsibility for the design, construction, inspection, monitoring, and/or maintenance of the system. A deed restriction describing the system shall be recorded. This document shall state that the deed restriction cannot be relinquished or abandoned without the written approval of the City of Tempe.

Engineer

Date

Arizona P.E. Number

STREET LIGHTING PLAN NOTES

1. All street lights to be streamline (architectural) per City of Tempe Standard Detail T-651 (T-652).
2. All street lights to be installed on foundations per City of Tempe Standard Detail T-651 (T-652).
3. All street lights to have individual pull box (J-Box), (provided by the utility company), installed within 2 to 4' from the base of the pole and per City of Tempe standard Detail T-650.
4. All street lights to be 2' from back of curb where recessed or no sidewalk exists, or 2' back of walk to the face of pole unless otherwise approved by City.
5. All street light conduit to be 2-1/2" PVC Schedule 40.

PERMIT AND AS-BUILT INFORMATION

UTILITY COMPANY SUBMITTALS

1. These plans have been submitted to the following utility companies and the work contained in these plans has been approved by these companies within their area of interest. The size and locations, as shown, of the gas, telephone and power lines, and connections agree with the information contained in the utility company's records. Where the work to be done conflicts with any of these utilities, the conflicts shall be resolved as specified in the special provisions and/or as otherwise noted on these plans. Conflicts arising during the course of construction from unforeseen circumstances shall be reported to the interested utility company and be resolved by them and the design engineer.
2. The City will not participate in the cost of construction or utility relocation.

Salt River Power District

Company Representative Contacted	Date

SRVWUA

Company Representative Contacted	Date

Arizona Public Service

Company Representative Contacted	Date

U. S. West Communications

Company Representative Contacted	Date

El Paso Natural Gas Co.

Company Representative Contacted	Date

Southwest Gas Co.

Company Representative Contacted	Date

Cox Cable T.V.

Company Representative Contacted	Date

Air Products

Company Representative Contacted	Date

Company Representative Contacted	Date

Company Representative Contacted	Date

Company Representative Contacted	Date

EXACTION POLICY NOTICE OF APPEAL RIGHTS

Applying for final approval for development or a building permit may lead to an administrative decision to condition approval of your permit on a dedication or an exaction. In accordance with ARS §9-500.12, we must inform you of your right to appeal such a determination and how that process operates.

In order to comply with the requirements for appeal, you must file with or mail a Notice of Appeal (in writing) with the City's designated hearing officer within thirty (30) days of the administrative decision. The Notice of Appeal shall set forth specifically the condition of approval requiring a dedication or exaction which does not bear an essential nexus with a legitimate government interest and is not a condition which is roughly proportional to the impact of the use to which you wish to place your property together with any reasons underlying your disagreement with said condition

Mail your Notice of Appeal to:

City of Tempe Hearing Officer
c/o Andy Goh, Deputy PW Manager/City Engineer
31 East 5th Street
Tempe, AZ 85281

There is not fee for filing. A hearing will be scheduled within thirty (30) days of the receipt of the appeal, and you will receive then (10) days notice of the date, time and place of your hearing, unless you indicate that you do not need then (10) days. A decision must be made by the hearing officer within five (5) days of the hearing and he may affirm, modify, or delete the requirement.

If you are dissatisfied with the decision, you may file a complaint for a new trial with the Maricopa County Superior Court within thirty (30) days of the hearing officer's decision. At all times during the appeals process, the burden is on the City to prove the conditions placed on your permit bear an essential nexus with a legitimate government interest and that the condition required is roughly proportional to the impact of the use, improvement, or development you have proposed.

You will be notified of specific requirements for exactions or dedications in writing by the City upon final plan check.

Andy Goh, P.E.
Deputy PW Manager/City Engineer